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ABSTRACT

This paper describes a test which attempts to measure a group of personality traits by analyzing the actual behavior of the participant in a computer-simulated game. ECHO evolved from an extension and computerization of Horstein and Deutsch's allocation game. The computerized version of ECHO requires subjects to make decisions about the allocation of monetary units into four interest areas. Four primary scores are obtained which are indicative of the intensities of behavior in the independence, cooperation, defensiveness and aggression regions. Their magnitudes are determined by the mean amounts of money allocated by the subjects to these respective areas. Test utility and applicability is discussed.
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ECHO: A COMPUTER BASED TEST FOR THE MEASUREMENT OF INDIVIDUALISTIC, COOPERATIVE, DEFENSIVE, AND AGGRESSIVE MODES OF BEHAVIOR.

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**Research, Development and Demonstration
Center in Education of Handicapped Children
Minneapolis, Minnesota**

September, 1974

U.S. DEPARTMENT OF HEALTH
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Department of Health, Education and Welfare

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Bureau of Education for the Handicapped



**RESEARCH AND DEVELOPMENT CENTER
IN EDUCATION OF HANDICAPPED CHILDREN**
Department of Special Education

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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

ECHO: A computer based test for the measurement of individualistic, cooperative, defensive, and aggressive modes of behavior.

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Since its beginning, the field of objective personality testing has been dominated by paper and pencil tests. This type of testing strategy measures, in the majority of cases, only reports about behavior, either actual or imagined. Rapid developments in the area of computer technology, paralleled by the increasing availability of time-sharing computing, make feasible several new strategies of personality assessment. The present report describes one of these alternative strategies, which attempts to measure a group of personality traits by analyzing the actual behavior of the participant in a computer-simulated game.

The allocation game.

ECHO evolved from an extension and computerization of Hornstein and Deutsch's (1967) allocation game. This original three-parameter experimental game required subjects to channel their efforts into several kinds of products; in this particular instance into coloring paper squares. Individualistic and cooperative modes of behavior were represented by black and blue squares respectively, while red squares represented weapons. The computerized version of ECHO required subjects to make decisions about the allocation of monetary units into four

interest areas. The instructions, displayed on a cathode-ray tube time-sharing computer terminal, read as follows:

"This game is a model of an international situation. You can make decisions about the allocation of nine units (each unit representing 10 billion dollars) into the following areas:

Independent enterprise: The expected payoff is double the original investment.

Cooperative enterprise: The expected payoff amounts to three times the joint investment.

Defense: Zero payoff, but every unit invested by you protects your state against twice as many units directed against you by your opponent.

Offense: The payoff which you gain from your opponent is five times greater than the original investment made by you.

The political situation is uncertain and your mutual relationships with other state (ruled by a computer named Cyber) are unclear. You can expect cooperation as well as aggression. Please make your decisions by entering nine whole units, separated by commas. Good Luck."

A typical game is shown on the following pages. Subjects enter their choices in response to a question mark at the end of the second line of each game. The subject's and computer's allocations are then displayed under the heading "LAYOUT." Note the choices allocated to defense are doubled. "PAYOFF" for both the player and the computer are displayed together with summary scores. The option whether to continue playing or not can be suppressed in an actual testing situation in which a standard test length is required.

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	5,3,1,0	
		LAYOUT					
PATRICIA		5	3	2	0		
CYBER		3	2	4	2		
		PAYOFF		TOTAL		SCORE	
PATRICIA		10	6	0	0	16	16
CYBER		6	6	0	0	12	12
WOULD YOU LIKE TO PLAY AGAIN ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	6,2,1,0	
		LAYOUT					
PATRICIA		6	2	2	0		
CYBER		2	3	4	2		
		PAYOFF		TOTAL		SCORE	
PATRICIA		12	6	0	0	18	34
CYBER		4	6	0	0	10	22
WOULD YOU LIKE TO PLAY AGAIN ? NO							
PATRICIA I HAVE TO PLAY AT LEAST 4 GAMES OR ELSE.							
WOULD YOU LIKE TO RECONSIDER ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	0,0,1,6	
		LAYOUT					
PATRICIA		0	0	2	8		
CYBER		5	3	2	0		
		PAYOFF		TOTAL		SCORE	
PATRICIA		0	0	0	30	30	64
CYBER		10	0	0	0	-20	2
WOULD YOU LIKE TO PLAY AGAIN ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	5,2,2,0	
		LAYOUT					
PATRICIA		5	2	4	0		
CYBER		6	2	2	0		
		PAYOFF		TOTAL		SCORE	
PATRICIA		10	6	0	0	16	30
CYBER		12	6	0	0	18	20
WOULD YOU LIKE TO PLAY AGAIN ? YES							

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	ENTERPRISE		ARMED FORCES			
	INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE	7,2,0,0,	
-----LAYOUT-----						
PATRICIA	7	2	0	0		
CYBER	0	0	2	8		
-----PAYOFF----->>>TOTAL>>SCORE						
PATRICIA	14	0	0	0	-26	54
CYBER	0	0	0	40	40	60
-----WOULD YOU LIKE TO PLAY AGAIN ? YES						

	ENTERPRISE		ARMED FORCES			
	INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE	?	0,0,0,9
-----LAYOUT-----						
PATRICIA	0	0	0	9		
CYBER	5	2	4	0		
-----PAYOFF-----						
PATRICIA	0	0	0	25	25	79
CYBER	10	0	0	0	-15	45
-----WOULD YOU LIKE TO PLAY AGAIN ? YES						

	ENTERPRISE		ARMED FORCES			
	INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE	?	7,1,1,0
-----LAYOUT-----						
PATRICIA	7	1	2	0		
CYBER	7	2	0	0		
-----PAYOFF----->>>TOTAL>>SCORE						
PATRICIA	14	3	0	0	17	96
CYBER	14	3	0	0	17	62
-----WOULD YOU LIKE TO PLAY AGAIN ? YES						

	ENTERPRISE		ARMED FORCES			
	INDEPENDENT		COOPERATIVE		DEFENSE OFFENSE ? 6,2,1,0	
	LAYOUT					
PATRICIA	6	2	2	0		
CYBER	0	0	0	9		
	PAYOFF				>>>TOTAL>>SCORE	
PATRICIA	12	0	0	0	-23	73
CYBER	0	0	0	35	35	97
	WOULD YOU LIKE TO PLAY AGAIN ? YES					

ENTERPRISE		ARMED FORCES	
INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ? 8,1,0,0
-----LAYOUT-----			
PATRICIA	1	0	0
CYBER	2	4	2
-----PATOFF-----			
PATRICIA	16	0	0
CYBER	4	0	10
		***TOTAL**	SCORE
		17	114
-----WOULD YOU LIKE TO PLAY AGAIN ? YES			

ENTERPRISE		ARMED FORCES	
INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ? 5,3,1
-----LAYOUT-----			
PATRICIA	3	2	-0
CYBER	3	4	2
-----PATOFF-----			
PATRICIA	10	0	0
CYBER	6	0	0
		***TOTAL**	SCORE
		12	126
-----WOULD YOU LIKE TO PLAY AGAIN ? YES			

ENTERPRISE		ARMED FORCES	
INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ? 6,3,1,0
-----LAYOUT-----			
PATRICIA	6	2	0
CYBER	5	0	0
-----PATOFF-----			
PATRICIA	12	0	0
CYBER	16	0	0
		***TOTAL**	SCORE
		19	145
-----WOULD YOU LIKE TO PLAY AGAIN ? YES			

ENTERPRISE		ARMED FORCES	
INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ? 0,3,2,4
-----LAYOUT-----			
PATRICIA	0	4	4
CYBER	5	2	-0
-----PATOFF-----			
PATRICIA	0	0	10
CYBER	10	0	0
		***TOTAL**	SCORE
		9	154
-----WOULD YOU LIKE TO PLAY AGAIN ? YES			

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	0/4/1/4	
		LAYOUT					
PATRICIA	0	4	2	4			
CYBER	6	2	2	0			
		PAYOFF				***TOTAL**	SCORE
PATRICIA	0	6	0	10	16		148
CYBER	12	6	0	0	8		162
-----WOULD YOU LIKE TO PLAY AGAIN ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	1/3/1/4	
		LAYOUT					
PATRICIA	1	3	2	4			
CYBER	0	3	4	4			
		PAYOFF				***TOTAL**	SCORE
PATRICIA	2	9	0	0	1		149
CYBER	0	9	0	10	19		181
-----WOULD YOU LIKE TO PLAY AGAIN ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	0/0/0/9	
		LAYOUT					
PATRICIA	0	0	0	9			
CYBER	0	4	2	4			
		PAYOFF				***TOTAL**	SCORE
PATRICIA	0	0	0	35	15		164
CYBER	0	0	0	20	-15		166
-----WOULD YOU LIKE TO PLAY AGAIN ? YES							

		ENTERPRISE		ARMED FORCES			
		INDEPENDENT	COOPERATIVE	DEFENSE	OFFENSE ?	0/0/0/9	
		LAYOUT					
PATRICIA	0	0	0	9			
CYBER	1	3	2	4			
		PAYOFF				***TOTAL**	SCORE
PATRICIA	0	0	0	35	15		179
CYBER	2	0	0	20	-13		153
*****LETS CALL IT QUITS AND CHAT FOR A CHANGE, J.K. ? J.K.							

The imago algorithm.

Since the original allocation game was designed to measure several behavioral strategies (Deutsch et. al., 1967) the conversion of ECHO from a strategy-oriented game into a personality test was accomplished by the introduction of the imago algorithm (Balcar, 1967). The rationale of the imago algorithm is similar to the reasoning behind projective tests: if there is nothing specific in the stimulus configuration to determine a particular type of response, then the response must be solely determined by some aspects of the inner organization of an individual. The imago algorithm goes one step farther: if an individual believes that his responses are reactions to the responses of an opponent, and if the reactions of his "adversary" simply mirror his own previous responses, then the subject's response should reflect some aspects of his own personality. The imago algorithm is thus designed along principles similar to those incorporated into the electronic feedback circuitry designed to amplify signals. In our case, that which is amplified are those aspects of the subject's personality which determine his game-related decisions.

The full course of the imago algorithm, as programmed into ECHO, consists of four distinct stages. During the first stage, the subject is presented with a neutral set of stimuli. This is followed by the first play period, in which the computer's strategy mirrors the previous responses of the subject. The first stage is then repeated to enable the subject to reevaluate his strategy and prevent him from discovering the principles comprising the imago algorithm. The fourth and last stage of the test is again characterized by the mimic feedback (i.e., as

in the first play period) inherent in the imago algorithm.

Parameters of the play

There are eight parameters of the play, which can be adjusted by the assignment of different values to variables on lines 140 through 210 of Version 2.0 of the ECHO program. These eight parameters and their corresponding descriptions are as follows:

The number of units to be distributed is NUNITS. This parameter is presently preset to nine. Other values within the range of 9 - 15 would probably have only a negligible effect on the game.

The length of the delay period (IDELAY), is presently preset at two. This parameter disguises the reciprocity of the game. Low values associated with this parameter maximize the amplifying effect of the imago algorithm, while higher values assure credibility of the simulated interaction.

IHALF, the length of the play, is preset to eight. The whole test in its present form therefore consists of sixteen separate plays.

The combination of IDELAY and IHALF parameters determine the spacing and length of the play's four component substages. As presently programmed, ECHO consists of four play periods: first neutral stage (plays one through three), first play period (plays four through eight), second neutral stage (plays nine through eleven), and second play period (plays twelve through sixteen).

The payoff parameters are presently preset on the basis of pilot experiments to the values of 2-3-[0,2]-5 for independent enterprise, cooperation, defense, and offense (IPFF - ICFF - [IDFF, IDBON] - IOFF),

respectively. These values were carefully balanced to assure as closely as possible an equal probability for the occurrence of each type of response.

Test scores, norms, and interpretation

Four primary scores are indicative of the intensities of behavior in the independence, cooperation, defensiveness and aggression regions. Their magnitudes are determined by the mean amounts of money allocated by the subjects to these respective areas. Other scores are possible, pertaining mainly to the dynamics of action and overall success of the player.

Variable test norms are implemented and updated after each testing run. This feature provides for an immediate analysis of each particular game. Interpretation of the game can be suppressed or used for the discussion of the game with the participant. An example of an interpretation is shown below:

"Patricia, your scores for independence, cooperation, defensiveness and aggression are 3.50, 1.75, .81, and 2.94. I administered this personality test to 7 subjects and as compared with them...Apropos, do you like to compare yourself to others? [No] O.K. but you will never know. Changed your mind? [Yes] In terms of T scores (where mean=50 and standard deviation=10) your standing on these four scales is 52.31, 44.22, 48.70 and 52.77. In plain language, you are: antonomous, cooperative, protective and combative. Your gains were average. Thank you for playing with me. Take care. Bye."

Test utility and applicability

ECHO was developed as an attempt to improve the classic paper and pencil test format by means of a testing strategy which measures actual behavior of both theoretical interest and practical significance.

Pilot experiments showed moderate correlations between test scores and several factorial scales of Cattell's et. al. Sixteen Personality Factors Questionnaire (1960) as well as the scales of Rozenzweig's Picture-Frustration Study (1969). These preliminary findings should be followed by test development and validation prior to making any conclusions in practical testing situations. Contingent upon standard development and validation procedures, ECHO has the potential of becoming a valuable addition to the behavioral researcher's testing inventory.

REFERENCES

- Balcar, K.R., Hra jako model rozhodování. Unpublished M. A. thesis. Charles University, 1967
- Cattell, R. B., Saunders, D. R., and Stice, B. Sixteen Personality Factor Questionnaire. Champaign, Ill: Institute for Personality and Ability Testing, 1960.
- Deutsch, M., Epstein, J., Canavan, D., and Gumpert, J. Strategies of inducing cooperation: An experimental study. The Journal of Conflict Resolution, 1967, 11, 345-360.
- Horstein, V.A., Deutsch, M. The tendencies to complete and to attack as a function of inspection, incentive and available alternatives. Unpublished manuscript, Columbia University, 1967.
- Rosenweig, S. Rosenweig Picture-Frustration Study. St. Louis; Mo: Author, 1949.

ECHO: A computer based test for the measurement
of individualistic, cooperative, defensive, and
aggressive modes of behavior.

Fortran source listing

Version 2.0

August, 1974

```
00100 PROGRAM X(INPUT,OUTPUT,NORMS,TAPES=INPUT,TAPE6=OUTPUT,TAPE7=NORMS)
00110 INTEGER P,C,D,O,DUM
00120 COMMON P(30),C(30),D(30),O(30)
00130 COMMON NAME,IDELAY,IHALF,NPLAYS,ICUMPAY,KCUMPAY
00140 NUNITS=9
00150 IDELAY=2
00160 IHALF=8
00170 IPFF=2
00180 ICFF=3
00190 IDFF=0
00200 IDBON=2
00210 IOFF=5
00220 IEND=IHALF*IHALF
00230 IARR=IEND+IDELAY*IDELAY
00240 IND=NUNITS/4
00250 IREM=NUNITS-4*IND
00260 IMIN=IDELAY*IDELAY
00270 ISTEP=IDELAY+1
00280 L=1
00290 K=IDELAY
00300 LL=IDELAY+1
00310 KK=IHALF*IDELAY
00320 LLL=KK+1
00330 KKK=2*IDELAY*IHALF
00340 LLLL=KKK+1
00350 KKKK=IARR
00360 ICUMPAY=KCUMPAY=NPLAYS=0
```

```
00370 DUM=0
00380 DO 5 M=L,K
00390 5 P(M)=C(M)=D(M)=O(M)=IND
00400 DO 6 M=LL,KK
00410 6 P(M)=C(M)=D(M)=O(M)=0
00420 DO 7 M=LLL,KKK
00430 7 P(M)=C(M)=D(M)=O(M)=IND
00440 DO 8 M=LLLL,KKKK
00450 8 P(M)=C(M)=D(M)=O(M)=0
00460 P(L)=P(L)+IREM
00470 C(LLL)=C(LLL)+IREM
00480 P(LLL+1)=P(LLL+1)+IREM
00490 C(L+1)=C(L+1)+IREM
00500 WRITE(6,10)DUM,
00510 10 FORMAT('HI, MY NAME IS CYBER AND I AM A COMPUTER. WHAT IS YOUR NAME•A1)
00520 READ (5,20),NAME
00530 20 FORMAT(A10)
00540 WRITE(6,30)NAME,
00550 30 FORMAT(A10• DO YOU NEED INSTRUCTIONS•)
00560 READ(5,40)INFO
00570 40 FORMAT(A10)
00580 IF(INFO.EQ.3HYES)CALL INST
00590 45 NPLAYS=NPLAYS+1
00600 WRITE(6,50)
00610 50 FORMAT('////,18X•ENTERPRISE•10X•ARMED FORCES•)
00620 WRITE(6,60)DUM,
00630 60 FORMAT(10X•INDEPENDENT COOPERATIVE DEFENSE OFFENSE•A1)
```

```

00640 90 READ(5,70)P(ISTEP),C(ISTEP),D(ISTEP),O(ISTEP)
00650 70 FORMAT(4(I1,1X))
00660 ISUM=P(ISTEP)+C(ISTEP)+D(ISTEP)+O(ISTEP)
00670 IF(ISUM.NE.NUNITS)WRITE(6,80)NUNITS
00680 80 FORMAT(*YOUR CHOICES MUST SUM TO*I3*I TRY AGAIN.*)
00690 IF(ISUM.NE.NUNITS)GO TO 90
00700 WRITE(6,95)
00710 95 FORMAT(*-----LAYOUT-----*+*+*+*)
00720 D(ISTEP)=D(ISTEP)*IDBON
00730 WRITE(6,100)NAME,P(ISTEP),C(ISTEP),D(ISTEP),O(ISTEP)
00740 100 FORMAT(A10,I8,I13,I9,I9)
00750 D(ISTEP-IDELAY)=D(ISTEP-IDELAY)*IDBON
00760 WRITE(6,110)P(ISTEP-IDELAY),C(ISTEP-IDELAY),D(ISTEP-IDELAY),O(ISTEP-IDELAY)
00770 110 FORMAT(*CYBER*5X,I8,I13,I9,I9)
00800 IPF=P(ISTEP)*IPFF
00810 KPF=P(ISTEP-IDELAY)*IPFF
00820 IF(C(ISTEP).GE.C(ISTEP-IDELAY))ICF=C(ISTEP-IDELAY)*ICFF
00830 IF(C(ISTEP).LT.C(ISTEP-IDELAY))ICF=C(ISTEP)*ICFF
00840 KCF=ICF
00850 IDF=KDF>IDFF
00860 IF(O(ISTEP).LE.D(ISTEP-IDELAY))IOF=0
00870 IF(O(ISTEP).GT.D(ISTEP-IDELAY))IOF=(O(ISTEP)-D(ISTEP-IDELAY))*IOFF
00880 KOF=O(ISTEP-IDELAY)-D(ISTEP)
00890 IF(KOF.LE.0)KOF=0
00900 IF(KOF.GT.0)KOF=KOF*IOFF
00950 WRITE(6,150)
00960 150 FORMAT(*-----PAYOFF----->>>TOTAL>>SCORE*)

```

```
00970 IPAYOFF=IPF+ICF+IOF-KOF
00980 KPAYOFF=KPF+KCF+KOF-IOF
00990 ICUMPAY=ICUMPAY+IPAYOFF
01000 KCUMPAY=KCUMPAY+KPAYOFF
01010 WRITE(6,130)NAME,IPF,ICF,IOF,IOF,IPAYOFF,ICUMPAY
01020 130 FORMAT(A10,I8,I13,2I9,I8,I7)
01030 WRITE(6,140)KPF,KCF,KOF,KOF,KPAYOFF,KCUMPAY
01040 140 FORMAT(=CYBER*5X,I8,I13,2I9,I8,I7)
01050 D(ISTEP)=D(ISTEP)/IDBON
01060 D(ISTEP-IDELAY)=D(ISTEP-IDELAY)/IDBON
01070 IF(NPLAYS.EQ.IHALF)ISTEP=ISTEP*3
01080 IF(NPLAYS.NE.IHALF)ISTEP=ISTEP*1
01090 IF(NPLAYS.EQ.IEND)CALL NOR
01100 WRITE(6,2)DUM,
01110 2 FORMAT(=-----WOULD YOU LIKE TO PLAY AGAIN=A1)
01120 READ(5,190)ANSWER
01130 190 FORMAT(A10)
01140 IF(ANSWER.EQ.3HYES)GO TO 45
01150 IF(ANSWER.NE.3HYES.AND.NPLAYS.LT.IMIN)473,474
01160 473 WRITE(6,200)NAME,IMIN
01170 200 FORMAT(A10= I HAVE TO PLAY AT LEAST*I2= GAMES OR ELSE.*)
01180 WRITE(6,201)DUM,
01190 201 FORMAT(=WOULD YOU LIKE TO RECONSIDER=A1)
01200 READ(5,190)REP
01210 IF(REP.EQ.3HYES)GO TO 45
01220 474 CONTINUE
01230 IF(NPLAYS.GE.IMIN)CALL NOR
01240 STOP
01250 END
```

```
01260 SUBROUTINE NOR
01270 INTEGER P,C,D,O
01280 INTEGER PS,CS,DS,OS
01290 COMMON P(30),C(30),D(30),O(30)
01300 COMMON NAME,IDELAY,IHALF,NPLAYS,ICUMPAY,KCUMPAY
01310 PS=CS=DS=OS=0
01320 J=IDELAY+1
01330 K=IDELAY+IHALF
01340 DO 10 I=J,K
01350 PS=PS+P(I)
01360 CS=CS+C(I)
01370 DS=DS+D(I)
01380 OS=OS+O(I)
01390 10 CONTINUE
01400 J=K+J
01410 K=J+IHALF-1
01420 DO 20 I=J,K
01430 PS=PS+P(I)
01440 CS=CS+C(I)
01450 DS=DS+D(I)
01460 OS=OS+O(I)
01470 20 CONTINUE
01480 IDUM=0
01490 WRITE(6,30)IDUM,
01500 30 FORMAT('>>>>>>LETS CALL IT QUITTS AND CHAT FOR A CHANGE, O.K.,*A1)
01510 READ(5,40)ANSWER
01520 40 FORMAT(A10)
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01530 IF(ANSWER.NE.2HND)GO TO 230
01540 IF(ANSWER.EQ.2HND)WRITE(6,200)IDUM,
01550 200 FORMAT(*OH, COME ON, ARE YOU GOING TO MISS IT*A1)
01560 READ(5,40)REPLY
01570 IF(REPLY.NE.2HND)STOP
01580 230 CONTINUE
01590 CALL GET(5HNORMS,5HNORMS,0,0)
01600 REWIND 7
01610 N=0
01620 5 READ(7,40)ID
01630 IF(EOF,7)3,4
01640 4 N=N+1
01650 GO TO 5
01660 3 CONTINUE
01670 CPS=FLOAT(PS)/FLOAT(NPLAYS)
01680 CCS=FLOAT(CS)/FLOAT(NPLAYS)
01690 CDS=FLOAT(DS)/FLOAT(NPLAYS)
01700 COS=FLOAT(OS)/FLOAT(NPLAYS)
01710 CIG=FLOAT(ICUMPAY)/FLOAT(NPLAYS)
01720 CKG=FLOAT(KCUMPAY)/FLOAT(NPLAYS)
01730 WRITE(7,50)NAME,CPS,CCS,CDS,COS,CIG,CKG,NPLAYS
01740 50 FORMAT(A10,6F6.2,I6)
01750 N=N+1
01760 REWIND 7
01770 CALL REPLACE(5HNORMS,5HNORMS,0,0)
01780 WRITE(6,60)NAME
01790 60 FORMAT(/,A10* YOUR SCORES FOR INDEPENDENCE, COOPERATION, DEFENSIVENESS *)
```

```
01800 WRITE(6,70)CPS,CCS,CDS,COS
01810 70 FORMAT(*AND AGGRESSION ARE*F5.2*,*F5.2*,*F5.2*, AND*F5.2*. I ADMINISTERED *)
01820 WRITE(6,80)N
01830 80 FORMAT(*THIS PERSONALITY TEST TO*15* SUBJECTS AND AS COMPARED WITH THEM...*)
01840 WRITE(6,100)IDUM,
01850 100 FORMAT(*APROPOS, DO YOU LIKE TO COMPARE YOURSELF TO OTHERS*A1)
01860 READ(5,110)AW
01870 110 FORMAT(A10)
01880 IF(AW.EQ.3HYES)GO TO 235
01890 WRITE(6,115)IDUM,
01900 115 FORMAT(*O.K. BUT YOU WILL NEVER KNOW. CHANGED YOUR MIND*A1)
01910 READ(5,110)AW
01920 IF(AW.NE.3HYES)STOP
01930 235 CONTINUE
01940 REWIND 7
01950 AP=AC*AD*AO*AG*QP*QC*QD*QO*QG=0.
01960 130 READ(7,120)S1,S2,S3,S4,S5
01970 120 FORMAT(10X,5F6,2)
01980 IF(EOF,7)140,150
01990 150 AP=AP*S1
02000 AC=AC*S2
02010 AD=AD*S3
02020 AO=AO*S4
02030 AG=AG*S5
02040 QP=QP*S1**2
02050 QC=QC*S2**2
02060 QD=QD*S3**2
```

02070 Q0=Q0+S4**2
02080 QG=QG+S5**2
02090 GO TO 130
02100 140 CONTINUE
02110 AMP=AP/FLOAT(N)
02120 AMC=AC/FLOAT(N)
02130 AMD=AD/FLOAT(N)
02140 AMO=AO/FLOAT(N)
02150 AMG=AG/FLOAT(N)
02160 AVP=SQRT(QP/FLOAT(N)-AMP**2)
02170 AVC=SQRT(QC/FLOAT(N)-AMC**2)
02180 AVD=SQRT(QD/FLOAT(N)-AMD**2)
02190 AVO=SQRT(QO/FLOAT(N)-AMO**2)
02200 AVG=SQRT(QG/FLOAT(N)-AMG**2)
02210 TP=10.0/AVP*(CPS-AMP)+50.0
02220 TC=10.0/AVC*(CCS-AMC)+50.0
02230 TD=10.0/AVD*(CDS-AMD)+50.0
02240 TO=10.0/AVO*(COS-AMO)+50.0
02250 TG=10.0/AVG*(CIG-AMG)+50.0
02260 WRITE(6,160)
02270 160 FORMAT(*IN TERMS OF T SCORES (WHERE MEAN=50 AND STANDARD DEVIATION=10)*)
02280 WRITE(6,170)TP,TC,TD,TO
02290 170 FORMAT(*YOUR STANDING ON THESE FOUR SCALES IS*F8.2*.)
02300 CALL DIAG(TP,TC,TD,TO,TG)
02310 STOP
02320 END

```
02330 SUBROUTINE DIAG(A,B,C,D,E)
02340 WRITE(6,10)
02350 10 FORMAT(*IN PLAIN LANGUAGE, YOU ARE!*)
02360 I=IFIX(A)
02370 J=IFIX(B)
02380 K=IFIX(C)
02390 L=IFIX(D)
02400 M=IFIX(E)
02410 IF(I.LT.40)WRITE(6,110)
02420 IF(I.GE.40.AND.I.LE.60)WRITE(6,120)
02430 IF(I.GT.60)WRITE(6,130)
02440 110 FORMAT(*NOT TOO INDEPENDENT*)
02450 120 FORMAT(*AUTONOMOUS*)
02460 130 FORMAT(*INDIVIDUALISTIC*)
02470 IF(J.LT.40)WRITE(6,210)
02480 IF(J.GE.40.AND.J.LE.60)WRITE(6,220)
02490 IF(J.GT.60)WRITE(6,230)
02500 210 FORMAT(*UNCOOPERATIVE*)
02510 220 FORMAT(*COOPERATIVE*)
02520 230 FORMAT(*COLLABORATIVE*)
02530 IF(K.LT.40)WRITE(6,310)
02540 IF(K.GE.40.AND.K.LE.60)WRITE(6,320)
02550 IF(K.GT.60)WRITE(6,330)
02560 310 FORMAT(*BENEVOLENT*)
02570 320 FORMAT(*PROTECTIVE*)
02580 330 FORMAT(*DEFENSIVE*)
```

02590 IF(L.LT.40)WRITE(6,410)
02600 IF(L.GE.40.AND.L.LE.60)WRITE(6,420)
02610 IF(L.GT.60)WRITE(6,430)
02620 410 FORMAT(*AND NONPUNITIVE.*)
02630 420 FORMAT(*AND COMHATIVE.*)
02640 430 FORMAT(*AND HOSTILE*)
02650 IF(M.LT.40)IGAIN=10HMEAGRE.
02660 IF(M.GE.40.AND.M.LE.60)IGAIN=10HAVERAGE.
02670 IF(M.GT.60)IGAIN=10HEXCELLENT.
02680 WRITE(6,700)IGAIN
02690 700 FORMAT(*YOUR GAINS WERE *A10)
02700 WRITE(6,500)
02710 500 FORMAT(*THANK YOU FOR PLAYING WITH ME. TAKE CARE. BYE.*)
02720 STOP
02730 END

```
02740 SUBROUTINE INST
02750 WRITE(6,10)
02760 10 FORMAT(/*THIS GAME IS A MODEL OF AN INTERNATIONAL SITUATION.*)
02770 WRITE(6,20)
02780 20 FORMAT(*YOU CAN MAKE DECISIONS ABOUT THE ALLOCATION OF NINE UNITS*)
02790 WRITE(6,30)
02800 30 FORMAT(*[EACH UNIT REPRESENTING 10 BILLION DOLLARS] INTO THE *)
02810 WRITE(6,40)
02820 40 FORMAT(*FOLLOWING AREAS:*)
02830 WRITE(6,50)
02840 50 FORMAT(*INDEPENDENT ENTERPRISE: THE EXPECTED PAYOFF IS DOUBLE*)
02850 WRITE(6,60)
02860 60 FORMAT(*THE ORIGINAL INVESTMENT.*)
02870 WRITE(6,70)
02880 70 FORMAT(*COOPERATIVE ENTERPRISE: THE EXPECTED PAYOFF AMOUNTS TO*)
02890 WRITE(6,80)
02900 80 FORMAT(*THREE TIMES THE JOINT INVESTMENT.*)
02910 WRITE(6,90)
02920 90 FORMAT(*DEFENSE: ZERO PAYOFF, BUT EVERY UNIT INVESTED BY YOU*)
02930 WRITE(6,100)
02940 100 FORMAT(*PROTECTS YOUR STATE AGAINST TWICE AS MANY UNITS*)
02950 WRITE(6,110)
02960 110 FORMAT(*DIRECTED AGAINST YOU BY YOUR OPPONENT.*)
02970 WRITE(6,120)
02980 120 FORMAT(*OFFENSE: THE PAYOFF WHICH YOU GAIN FROM YOUR OPPONENT*)
02990 WRITE(6,130)
03000 130 FORMAT(*IS FIVE TIMES GREATER THAN THE ORIGINAL INVESTMENT*)
```

03010 WRITE(6,140)
03020 140 FORMAT(*MADE BY YOU.*)
03030 WRITE(6,150)
03040 150 FORMAT(*THE POLITICAL SITUATION IS UNCERTAIN AND YOUR MUTUAL*)
03050 WRITE(6,160)
03060 160 FORMAT(*RELATIONSHIPS WITH THE OTHER STATE [RULED BY *]
03070 WRITE(6,170)
03080 170 FORMAT(*A COMPUTER NAMED CYBER) ARE UNCLEAR. YOU CAN EXPECT*)
03090 WRITE(6,180)
03100 180 FORMAT(*COOPERATION AS WELL AS AGGRESSION. PLEASE MAKE YOUR*)
03110 WRITE(6,190)
03120 190 FORMAT(*DECISIONS BY ENTERING FOUR WHOLE UNITS, SEPARATED BY*)
03130 WRITE(6,200)
03140 200 FORMAT(*COMMAS. GOOD LUCK.*)
03150 RETURN
03160 END

TECHNICAL REPORTS

University of Minnesota Research, Development and Demonstration
Center in Education of Handicapped Children

(Place of publication shown in parentheses where applicable)

1. P. Krus, M. Thurlow, J. Turnure & A. Taylor. Summative evaluation of the Time with the Clock Unit of the Money, Measurement and Time Program. Research Report #73. October 1974.
2. P. Krus, M. Thurlow, J. Turnure & A. Taylor. Summative evaluation of the Measurement of Weight Unit of the Money, Measurement and Time Program. Research Report #72. October 1974.
3. P. Krus, M. Thurlow, J. Turnure & A. Taylor. Summative evaluation of the Measurement of Length Unit of the Money, Measurement and Time Program. Research Report #71. October 1974.
4. P. Krus, M. Thurlow, J. Turnure & A. Taylor. Summative evaluation of the Money Unit of the Money, Measurement, and Time Program. Research Report #70. October 1974.
5. P. Krus, M. Thurlow, J. Turnure, A. Taylor & R. Howe. The formative evaluation design of the Vocabulary Development Project. Occasional Paper #31. October 1974.
6. J. Rynders, J. Horrobin, L. Wangness & J. Swanson. The severe nature of verbal learning deficits in preschool Down's Syndrome (mongoloid) children. Research Report #69. August 1974.
7. R. Riegel. Reliability of children's sorting strategies using alternate forms of the SORTS test. Research Report #68. August 1974.
8. S. Fisher, D. Moores, & M. J. Harlow. Post-secondary programs for the deaf: III. Internal view. Research Report #67.
9. W. Bart. A set-theoretic model for the behavioral classification of environments. Occasional Paper #29. July 1974.
10. D. Krus, W. Bart & P. Airasian. Ordering theory and methods. Occasional Paper #28. July 1974.
11. B. Egeland & A. Thibodeau. Selective attention of impulsive and reflective children. Research Report #66. July 1974.
12. R. Hoffmeister, B. Best & D. Moores. The acquisition of sign language in deaf children of deaf parents: Progress Report. Research Report #65. June 1974.
13. P. Krus. Use of family history data to predict intellectual and educational functioning longitudinally from ages four to seven. Research Report #64. June 1974.

14. P. Krus. Analyzing for individual differences in evaluating compensatory education programs. Occasional Paper #27. June 1974.
15. J. Rondal. The role of speech in the regulation of behavior. Research Report #63. June 1974.
16. N. Buim, J. Rynders, & J. Turnure. A semantic-relational-concepts based theory of language acquisition as applied to Down's Syndrome children: Implication for a language enhancement program. Research Report #62. May 1974.
17. D. Moores, M. Harlow, & S. Fisher. Post-secondary programs for the deaf: II. External view. Research Report #61. March 1974.
18. D. Moores, M. Harlow, & S. Fisher. Post-secondary programs for the deaf: I. Introduction and overview. Research Report #60. March 1974.
19. D. Krus. Synopsis of basic theory and techniques of order analysis. Occasional Paper #26. April 1974.
20. S. Samuels, J. Spiroff & H. Singer. Effect of pictures and contextual conditions on learning to read. Occasional Paper #25. March 1974.
21. A. Taylor, M. Thurlow & J. Turnure. Elaboration as an instructional technique in the vocabulary development of EMR children. Research Report #59. March 1974.
22. N. Buim & J. Turnure. The universality of self-generated verbal mediators as a means of enhancing memory processes. Research Report #58. January 1974.
23. D. Moores, K. Weiss, & M. Goodwin. Evaluation of programs for hearing impaired children: Report of 1972-73. Research Report #57. December 1973.
24. J. Turnure & W. Charlesworth, D. Moores, J. Rynders, M. Horrobin, S. Samuels, & R. Wozniak. American Psychological Association Symposium Papers. Occasional Paper #24. December 1973.
25. N. Buim. Interrogative types of parental speech to language learning children: a linguistic universal? Research Report #56. December 1973.
26. D. Krus. An outline of the basic concepts of order analysis. Occasional Paper #23. February 1974.
27. D. Krus. Order analysis: A fortran program for generalizable multidimensional analysis of binary data matrices. Occasional Paper #22. November 1973.
28. W. Bart. The pseudo-problem of IQ. Occasional Paper #21. October 1973.
29. J. Turnure & M. Thurlow. Verbal elaboration and the enhancement of language abilities in the mentally retarded: The role of interrogative sentence-forms. Occasional Paper #20. October 1973.

30. P. Dahl, S. Samuels & T. Archwamety. A mastery based experimental program for teaching poor readers high speech word recognition skills. Research Report #55. September 1973.
31. R. Riegel, F. Danner & L. Donnelly. Developmental trends in the generation and utilization of associative relations for recall by EMR and non-retarded children: The SORTS test. Research Report #54. August 1973.
32. R. Hoffmeister & D. Moores. The acquisition of specific reference in the linguistic system of a deaf child of deaf parents. Research Report #53. August 1973.
33. W. Bart & M. Smith. An interpretive framework of cognitive structures. Occasional Paper #19. June 1973.
34. C. Clark & J. Greco. MELDS (Minnesota Early Language Development Sequence) glossary of rebus and signs. Occasional Paper #18. June 1973.
35. J. Turnure. Interrelations of orienting response, response latency and stimulus choice in children's learning. Research Report #52. May 1973.
36. S. Samuels & P. Dahl. Automaticity, reading and mental retardation. Occasional Paper #17. May 1973.
37. S. Samuels & P. Dahl. Relationships among IQ, learning ability, and reading achievement. Occasional Paper #16. May 1973.
38. N. Buium & J. Rynders. The early maternal linguistic environment of normal and Down's Syndrome (Mongoloid) language learning children. Research Report #51. May 1973.
39. T. Archwamety & S. Samuels. A mastery based experimental program for teaching mentally retarded children word recognition and reading comprehension skills through use of hypothesis/test procedures. Research Report #50. May 1973.
40. W. Bart. The process of cognitive structure complexification. Research Report #49. April 1973. Occasional
41. B. Best. Classificatory development in deaf children: Research on language and cognitive development. Occasional Paper #15. April 1973.
42. R. Riegel, A. Taylor, & F. Danner. The effects of training in the use of grouping strategy on the learning and memory capabilities of young EMR children. Research Report #48. April 1973.
43. J. Turnure & M. Thurlow. The latency of forward and backward association responses in an elaboration task. Research Report #47. March 1973.
44. R. Riegel & A. Taylor. Strategies in the classroom: A summer remedial program for young handicapped children. Occasional Paper #14. March 1973.
45. D. Moores. Early childhood special education for the hearing impaired. Occasional Paper #13. February 1973.

46. R. Riegel & A. Taylor. A comparison of conceptual strategies for grouping and remembering employed by educable mentally retarded and non-retarded children. Research Report #46. February 1973.
47. J. Rynders. Two basic considerations in utilizing mothers as tutors of their very young retarded or potentially retarded children. Occasional Paper #12. January 1973.
48. R. Bruininks, J. Rynders & J. Gross. Social acceptance of mildly retarded pupils in resource rooms and regular classes. Research Report #45. January 1973.
49. J. Turnure & M. Thurlow. The effects of interrogative elaborations on the learning of normal and EMR children. Research Report #44. January 1973. (Proceedings of the International Association for the Scientific Study of Mental Deficiency, in press).
50. J. Turnure & S. Samuels. Attention and reading achievement in first grade boys and girls. Research Report #43. November 1972. (Journal of Educational Psychology, 1974, 66, 29-32).
51. R. Riegel, A. Taylor, S. Clarren, & F. Danner. Training educationally handicapped children to use associative grouping strategies for the organization and recall of categorizable materials. Research Report #42. November 1972.
52. R. Riegel, F. Danner, & A. Taylor. Steps in sequence: Training educationally handicapped children to use strategies for learning. Development Report #2. November 1972.
53. A. Taylor, M. Thurlow, & J. Turnure. The teacher's introduction to: The Math Vocabulary Program. Development Report #1. March 1973.
54. J. Turnure & M. Thurlow. The effects of structural variations in elaboration on learning by normal and EMR children. Research Report #41. September 1972.
55. A. Taylor & N. Bender. Variations of strategy training and the recognition memory of EMR children. Research Report #40. September 1972. (American Educational Research Journal, in press.)
56. D. Moores, C. McIntyre, & K. Weiss. Evaluation of programs for hearing impaired children: Report of 1971-72. Research Report #39. September 1972.
57. R. Rubin. Follow-up of applicants for admission to graduate programs in special education. Occasional Paper #11. July 1972.
58. D. Moores. Communication -- Some unanswered questions and some unquestioned answers. Occasional Paper #10. July 1972.
59. A. Taylor & S. Whitely. Overt verbalization and the continued production of effective elaborations by EMR children. Research Report #38. June 1972. (American Journal of Mental Deficiency, in press.)

60. R. Riegel. Measuring educationally handicapped children's organizational strategies by sampling overt groupings. Research Report #37. May 1972.
61. E. Gallistel, M. Boyle, L. Curran, & M. Hawthorne. The relation of visual and auditory aptitudes to first grade low readers' achievement under sight-word and systematic phonic instruction. Research Report #36. May 1972.
62. E. Gallistel & P. Fischer. Decoding skills acquired by low readers taught in regular classrooms using clinical techniques. Research Report #35. May 1972.
63. J. Turnure & M. Thurlow. Verbal elaboration in children: Variations in procedures and design. Research Report #34 March 1972.
64. D. Krus & W. Bart. An ordering-theoretic method of multidimensional scaling of items. Research Report #33. March 1972.
65. J. Turnure & S. Larsen. Effects of various instruction and reinforcement conditions on the learning of a three-position oddity problem by nursery school children. Research Report #32. March 1972.
66. J. Turnure & S. Larsen. Outerdirectedness in mentally retarded children as a function of sex of experimenter and sex of subject. Research Report #31. March 1972.
67. J. Rynders & M. Horrobin. A mobile unit for delivering educational services to Down's Syndrome (Mongoloid) infants. Research Report #30. January 1972. (Presented at Council for Exceptional Children, Special National Conference, Memphis, December, 1971.)
68. F. Danner & A. Taylor. Pictures and relational imagery training in children's learning. Research Report #29. December 1971. (Journal of Experimental Child Psychology, in press.)
69. J. Turnure & M. Thurlow. Verbal elaboration phenomena in nursery school children. Research Report #28. December 1971. (Study II: Proceedings of 81st Annual Convention of the American Psychological Association, 1973, 83-84.)
70. D. Moores & C. McIntyre. Evaluation of programs for hearing impaired children: Progress report 1970-71. Research Report #27. December 1971.
71. S. Samuels. Success and failure in learning to read: A critique of the research. Occasional Paper #9. November 1971. (In M. Kling, The Literature of Research in Reading with Emphasis on Modes, Rutgers University, 1971.)
72. S. Samuels. Attention and visual memory in reading acquisitions. Research Report #26. November 1971.
73. J. Turnure & M. Thurlow. Verbal elaboration and the promotion of transfer of training in educable mentally retarded children. Research Report #25. November 1971. (Journal of Experimental Child Psychology, 1973, 15, 137-148.)
74. A. Taylor, M. Josberger, & S. Whitely. Elaboration training and verbalization as factors facilitating retarded children's recall. Research Report #24. October 1971. (Journal of Educational Psychology, in press.)

75. W. Bart & D. Krus. An ordering-theoretic method to determine hierarchies among items. Research Report #23. September 1971.
76. A. Taylor, M. Josberger, & J. Knowlton. Mental elaboration and learning in retarded children. Research Report #22. September 1971. (Mental Elaboration and Learning in EMR children. American Journal of Mental Deficiency, 1972, 77, 69-76.)
77. J. Turnure & S. Larsen. Outdirectedness in educable mentally retarded boys and girls. Research Report #21. September 1971. (American Journal of Mental Deficiency, in press.)
78. R. Bruininks, T. Glaman, & C. Clark. Prevalency of learning disabilities: Findings, issues, and recommendations. Research Report #20. June 1971. (Presented at Council for Exceptional Children Convention, Miami Beach, April, 1971.)
79. M. Thurlow & J. Turnure. Mental elaboration and the extension of mediational research: List length of verbal phenomena in the mentally retarded. Research Report #19. June 1971. (Journal of Experimental Child Psychology, 1972, 14, 184-195.)
80. G. Siegel. Three approaches to speech retardation. Occasional Paper #8. May 1971.
81. D. Moores. An investigation of the psycholinguistic functioning of deaf adolescents. Research Report #18. May 1971. (Exceptional Children, 1970, 36, 645-652.)
82. D. Moores. Recent research on manual communication. Occasional Paper #7. April 1971. (Keynote Address, Division of Communication Disorders, Council for Exceptional Children Annual Convention, Miami Beach, April 1971.)
83. J. Turnure, S. Larsen, & M. Thurlow. Two studies on verbal elaboration in special populations. I. The effects of brain injury; II. Evidence of transfer of training. Research Report #17. April 1971. (Study 1: American Journal of Mental Deficiency, 1973, 78, 70-76.)
84. R. Bruininks & J. Rynders. Alternatives to special class placement for educable mentally retarded children. Occasional Paper #6. March 1971. (Focus on Exceptional Children, 1971, 3, 1-12.)
85. D. Moores. Neo-oralism and the education of the deaf in the Soviet Union. Occasional Paper #5. February 1971. (Exceptional Children, 1972, 39, 377-384.)
86. D. Feldman, B. Marrinan, & S. Hartfeldt. Unusualness, appropriateness, transformation and condensation as criteria for creativity. Research Report #16. February 1971. (American Educational Research Association Annual Conference, New York, February 1971.)
87. P. Broen & G. Siegel. Variations in normal speech disfluencies. Research Report #15. January 1971. (Language & Speech, in press.)
88. D. Feldman. Map understanding as a possible crystallizer of cognitive structures. Occasional Paper #4. January 1971. (American Educational Research Journal, 1971, 3, 484-502.)

89. J. Rynders. Industrial arts for elementary mentally retarded children: An attempt to redefine and clarify goals. Occasional Paper #3. January 1971.
90. D. Moores. Education of the deaf in the United States. Occasional Paper #2. November 1970. (Moscow Institute of Defectology, 1971, published in Russian.)
91. R. Bruininks & C. Clark. Auditory and learning in first-, third-, and fifth-grade children. Research Report #14. November 1970.
92. R. Bruininks & C. Clark. Auditory and visual learning in first grade educable mentally retarded normal children. Research Report #13. November 1970. (American Journal of Mental Deficiency, 1972, 76, No. 5, 561-567.)
93. R. Bruininks. Teaching word recognition to disadvantaged boys with variations in auditory and visual perceptual abilities. Research Report #12. November 1970. (Journal of Learning Disabilities, 1970, 3, 30-39.)
94. R. Bruininks & W. Lucker. Change and stability in correlations between intelligence and reading test scores among disadvantaged children. Research Report #11. October 1970. (Journal of Reading Behavior, 1970, 2, 295-305.)
95. R. Rubin. Sex differences in effects of kindergarten attendance on development of school readiness and language skills. Research Report #10. October 1970. (Elementary School Journal, 72, No. 5, February, 1972.)
96. R. Rubin & B. Balow. Prevalence of school learning & behavior disorders in a longitudinal study population. Research Report #9. October 1970. (Exceptional Children, 1971, 38, 293-299.)
97. D. Feldman & J. Brattor. On the relativity of giftedness: An empirical study. Research Report #8. August 1970. (American Educational Research Annual Conference, New York, February 1971.)
98. J. Turnure, M. Thurlow, & S. Larsen. Syntactic elaboration in the learning & reversal of paired-associates by young children. Research Report #7. January 1971.
99. R. Martin & L. Berndt. The effects of time-out on stuttering in a 12-year-old boy. Research Report #6. July 1970. (Exceptional Children, 1970, 37, 303-304.)
100. J. Turnure & M. Walsh. The effects of varied levels of verbal mediation on the learning and reversal of paired associates by educable mentally retarded children. Research Report #5. June 1970. (Study I: American Journal of Mental Deficiency, 1971, 76, 60-67. Study II: American Journal of Mental Deficiency, 1971, 76, 306-312.)
101. J. Turnure, J. Rynders, & N. Jones. Effectiveness of manual guidance, modeling & trial and error learning for inducing instrumental behavior in institutionalized retardates. Research Report #4. June 1970. (Verrill-Palmer Quarterly, 1973, 19, 49-65.)

102. J. Turnure. Reactions to physical and social distractors by moderately retarded institutionalized children. Research Report #3. June 1970. (Journal of Special Education, 1970, 4, 283-294.)
103. D. Moores. Evaluation of preschool programs: An interaction analysis model. Occasional Paper #1. April 1970. (Keynote Address, Diagnostic Pedagogy, International Congress on Deafness. Stockholm, August 1970; also presented at American Instructors of the Deaf Annual Convention, St. Augustine, Florida, April 1970.)
104. D. Feldman & W. Markwalder. Systematic scoring of ranked distractors for the assessment of Piagetian reasoning levels. Research Report #2. March 1970. (Educational and Psychological Measurement, 1971, 31, 347-362.)
105. D. Feldman. The fixec-sequence hypothesis: Individual differences in the development of school related spatial reasoning. Research Report #1. March 1970.